



Armed Forces College of Medicine AFCM



Pathology of Joint Diseases

Lecture Plan



1. Part 1 (5 min) Introduction
2. Part 2 (35 min) Main lecture
3. Part 3 (5 min) Summary
4. Lecture Quiz (5 min)

INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to

- 1. List types and causes of arthritis.**
- 2. Discuss pathology of acute suppurative arthritis**
- 3. Mention the pathogenesis of rheumatoid arthritis**
- 4. Describe articular lesions of rheumatoid arthritis.**
- 5. List extra-articular lesions of rheumatoid arthritis.**
- 6. List causes of osteoarthritis**
- 7. Explain pathology of osteoarthritis.**
- 8. Mention etiology of gouty arthritis**

Arthritis



Definition of arthritis:

It is inflammation of the joints.

Types:

Acute

1. Suppurative
2. Traumatic
3. Rheumatic
4. Viral
5. Acute gouty arthritis

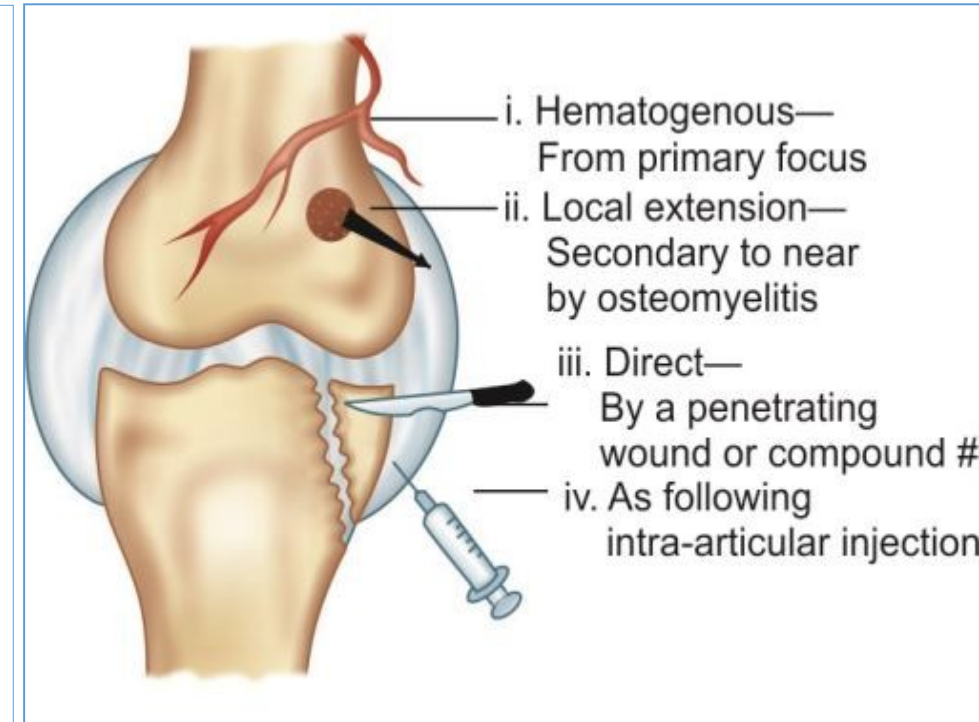
Chronic

1. Osteoarthritis
2. Rheumatoid arthritis
3. Chronic gouty arthritis
4. Tuberculous arthritis
(general pathology)
5. Syphilitic arthritis
6. Hemophilic arthritis

Acute suppurative arthritis



- ❖ **Definition :** Acute inflammation that commonly involves a single large joint e.g: hip or knee
- ❖ **Organism:** staph. Aureus, less commonly streptococci
- ❖ **Route of infection:**
 - Direct □ from osteomyelitis
 - Penetrating injuries
 - Blood borne



<https://jaypeedigital.com/book/9789350251096/chapter/ch4>

Acute suppurative arthritis



❖ Clinically:

Joint is swollen (with pus), red, hot and tender with marked restriction of movement

❖ Pathology:

- Suppurative inflammation of joint space and the surrounding soft tissue
- Destruction of articular cartilage → healing by fibrosis → fibrous ankylosing



Rheumatoid arthritis



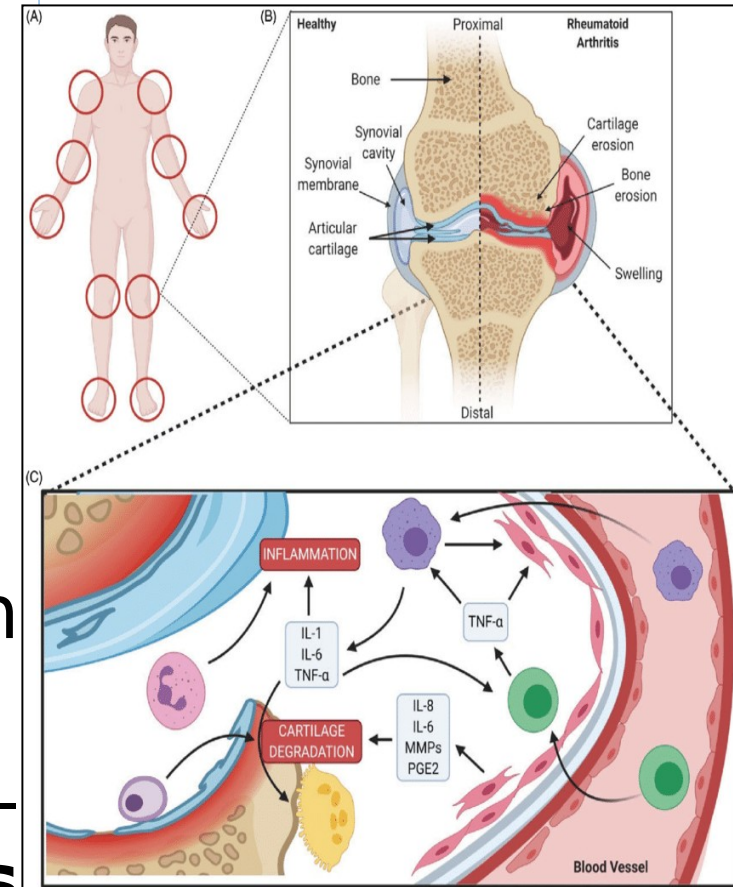
❖ **Autoimmune** collagen disease, more common in females between 30-50 years.

❖ Pathology:

- 1- Articular
- 2- Extraarticular

❖ PATHOGENESIS:

- An autoimmune mechanism of unknown stimulus
- Autoantibodies are liberated--> inflammatory reaction.-----> **cytokines** as **TNF** & **interleukins** as well as **enzymes** as **proteases** □ destruction of joint structures



Rheumatoid arthritis



PATHOLOGY: **lesions**

1- Articular (joint)

- Polyarthrititis
- Involving mainly small joints of hands and feet
- Symmetrical involvement
- The involved joints are swollen, painful and stiff



https://en.wikipedia.org/wiki/Rheumatoid_arthritis#/media/File:Rheumatoid



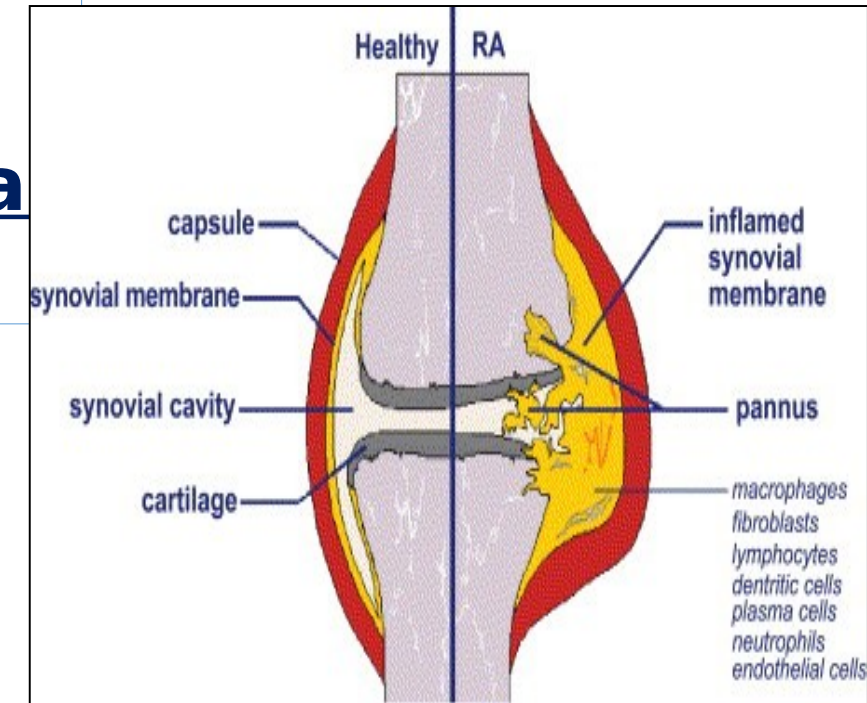
<https://www.docwirenews.com/home-page-editor-picks/what-aggravates-rheuma>

Rheumatoid arthritis



PATHOLOGY: **1- Articular** **(joint) lesions**

A. Chronic inflammation of the synovia **membrane:**



<https://www.sciencedirect.com/science/article/abs/pii/S0009898104003>

Rheumatoid arthritis



PATHOLOGY: (joint) lesions

1- Articular

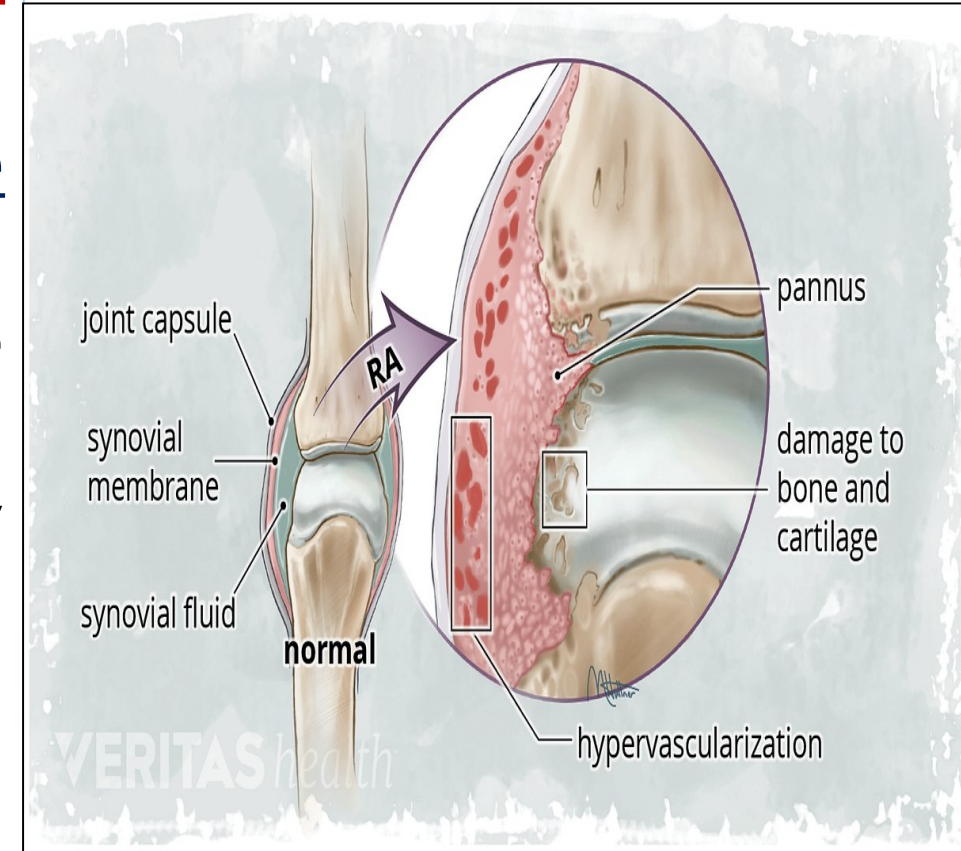
B. Excessive granulation tissue formation

- Creeps under the articular cartilage within the eroded bone, and over the articular cartilage and may communicate on both surfaces.

(Pannus)

C. Articular cartilage is destroyed

---> healing by fibrosis--> **fibrous ankylosing** ---> **bony ankylosing** ---> the joint becomes **deformed**



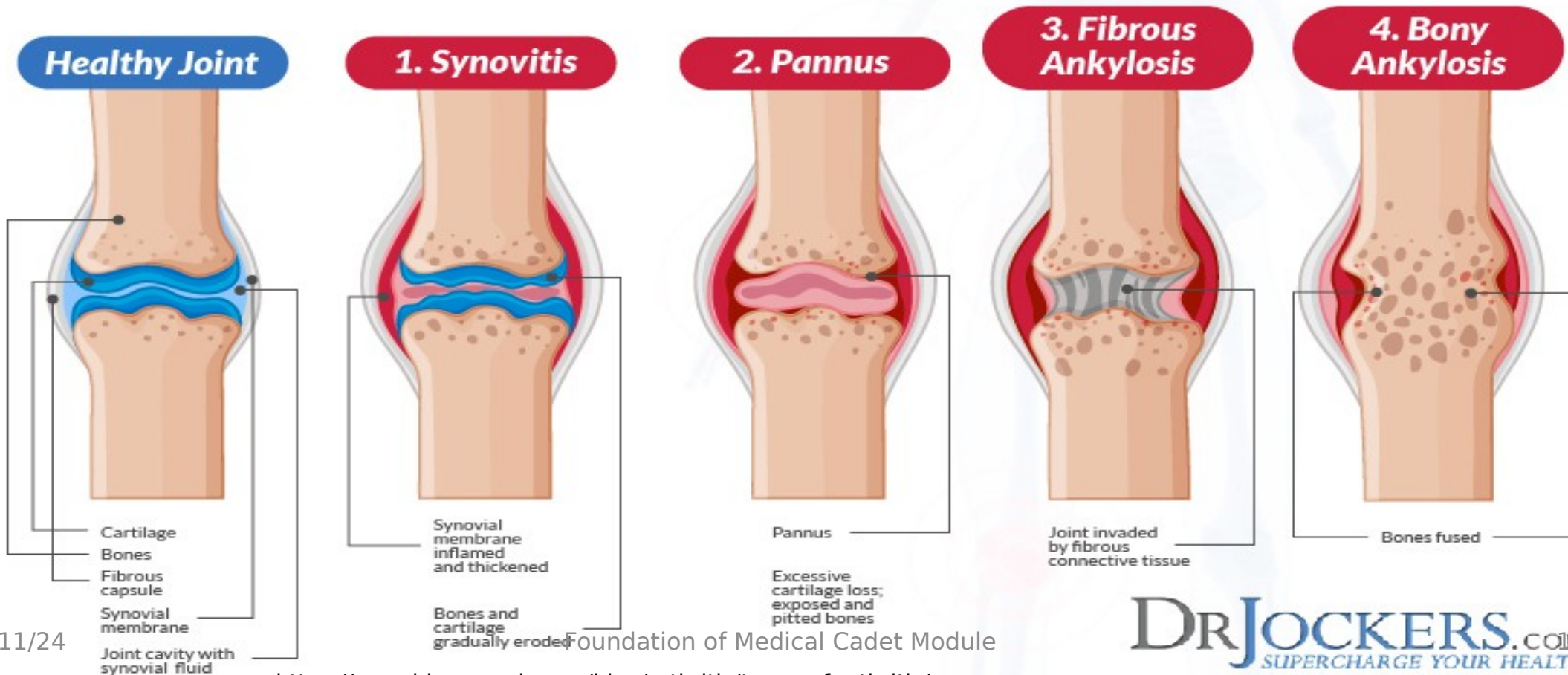
Rheumatoid arthritis



IOLOGY:

1- Articular (joint) lesions

Stages of Rheumatoid Arthritis



6/11/24

Foundation of Medical Cadet Module

<https://www.himaavush.com/blog/arthritis/types-of-arthritis/>

DRJOCKERS.COM
SUPERCHARGE YOUR HEALTH

RHEUMATOID ARTHRITIS



PATHOLOGY: 2- Extra- articular lesions

a) Rheumatoid nodules:

Mainly develop
subcutaneously over bony
prominences



<https://www.pcids.org.uk/clinical-guidance/rheumatoid-nodules>



immemorandum

RHEUMATOID ARTHRITIS



PATHOLOGY: **lesions**

2- Extra-articular

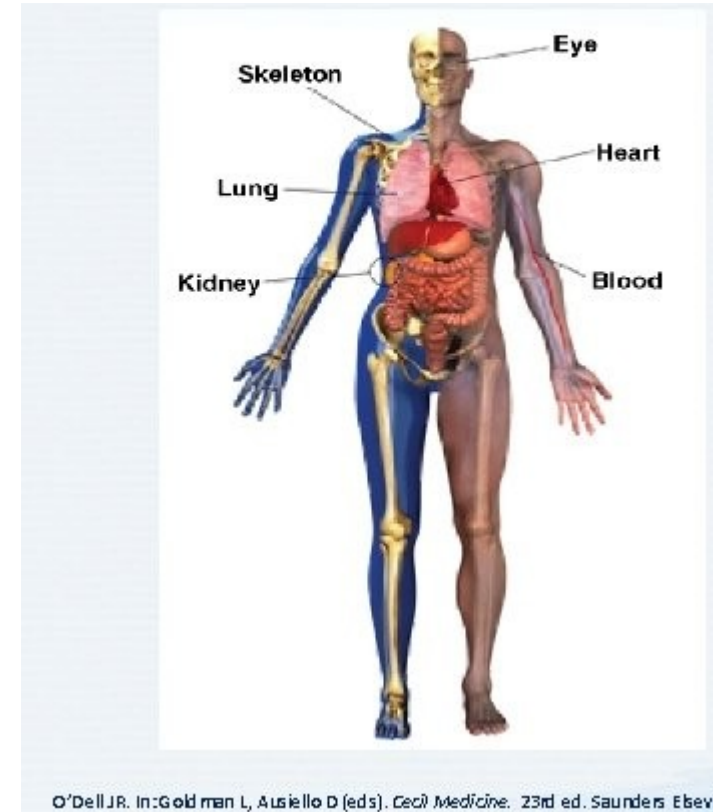
b) Heart lesions:

Rheumatoid nodules affecting the valves and pericardium.

c) Vascular lesions: Arteritis.

d) Lymphoid hyperplasia and enlargement of lymph nodes and spleen.

e) Amyloidosis may sometimes occur.



O'Dell JR. In: Goldman L, Ausiello D (eds). Cecil Medicine. 23rd ed. Saunders Elsevier

<https://slidetodoc.com/assessment-and-diagnosis-overview-treating-underlying-causes-of/>

Osteoarthritis (OA)

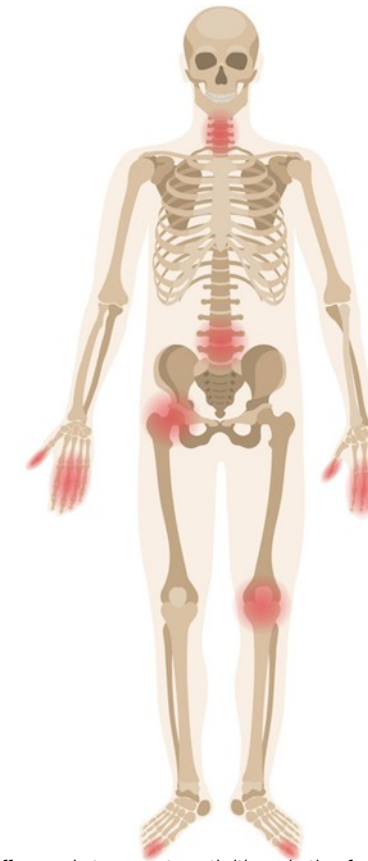


- (OA) is a common **degenerative disease** characterized by primary abnormalities in the articular cartilage of **weight bearing joints** (knee, hip and spines are the most common sites).

Types:

1. Primary (95%) affects old females > males (wear & tear joints)
2. Secondary (5%) affects any age

Osteoarthritis



<https://curearthritis.org/what-is-the-difference-between-osteoarthritis-and-other-forms-of-autoimmune-arthritis-such-as-rheumatoid-arthritis/>

Osteoarthritis (OA)



2. Secondary Osteoarthritis: It can affect any age

A. Chronic joint stress

e.g. due to obesity and occupational strains.

B. Abnormal joint mechanics e.g.

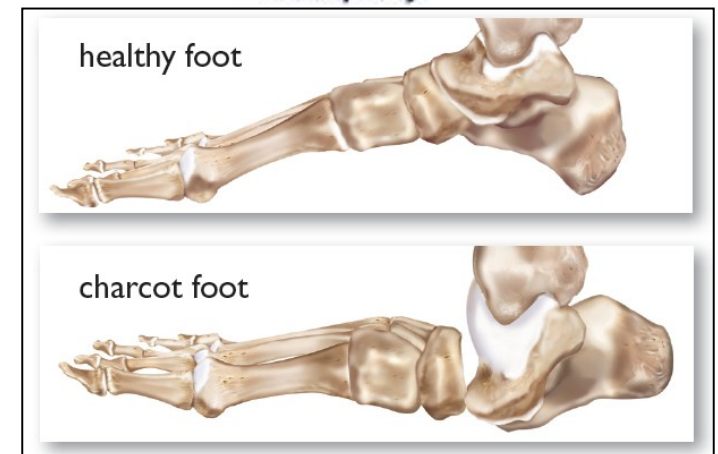
- Defective nerve supply to a joint
- Congenital joint deformities
- Acquired joint deformities e.g post-traumatic

C. Systemic disease (helping factors) : as diabetes mellitus



Deformity of both feet from collapse of the midfoot arch due to Charcot neuropathic arthropathy -in this case in a patient with alcoholic peripheral neuropathy

<https://www.amputee-coalition.org/resources/prosthetic-primer/>



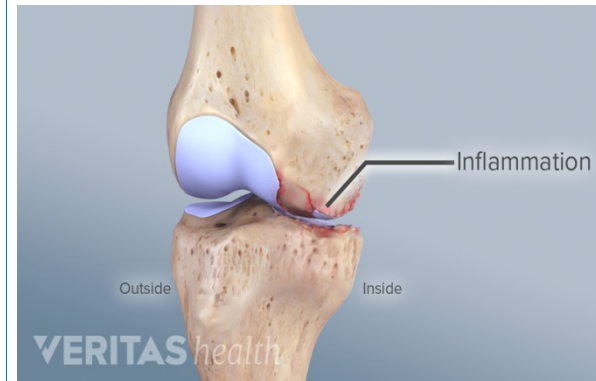
<https://capfootandankle.com/charcot-foot/>

Osteoarthritis (OA)



1. Articular cartilage & bone lesions:

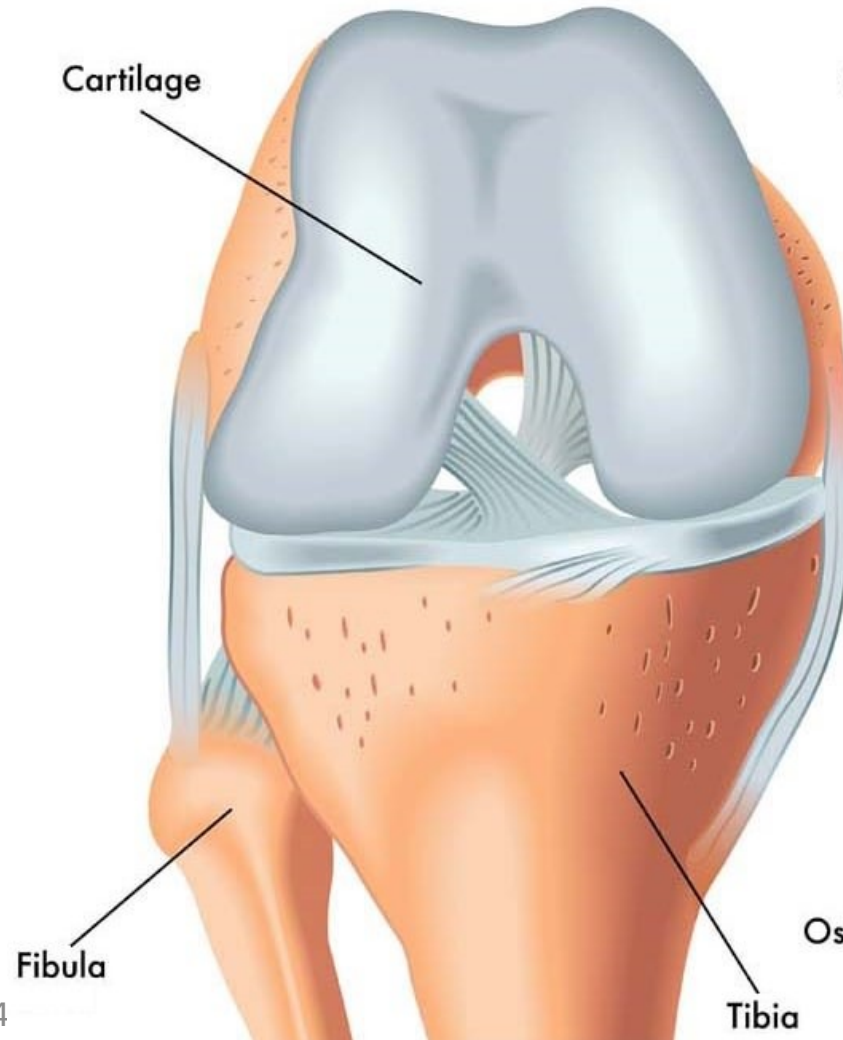
- Degeneration and softening of articular cartilage then disappears and the underlying bone is exposed.
- Proliferation of the peripheral parts of cartilage occur ---> cartilaginous lipping ---> Ossification of these lipping leads to bony projections (osteophytes)
- Separated portions of degenerated cartilage may float freely in the joint (joint mice)
- The underlying bone undergoes progressive eburnation.



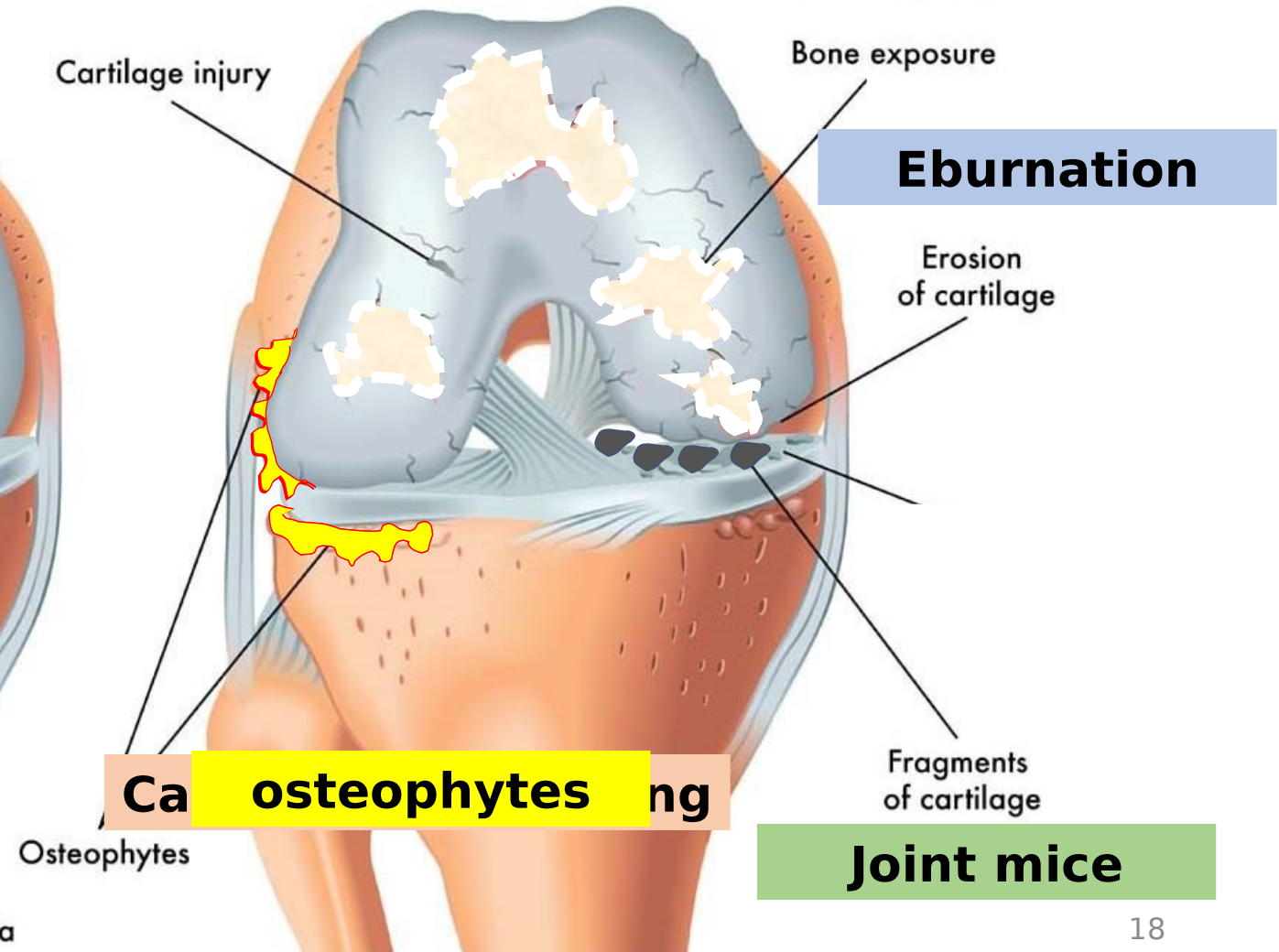
Osteoarthritis (OA)



Normal knee



Arthrosis of the knee



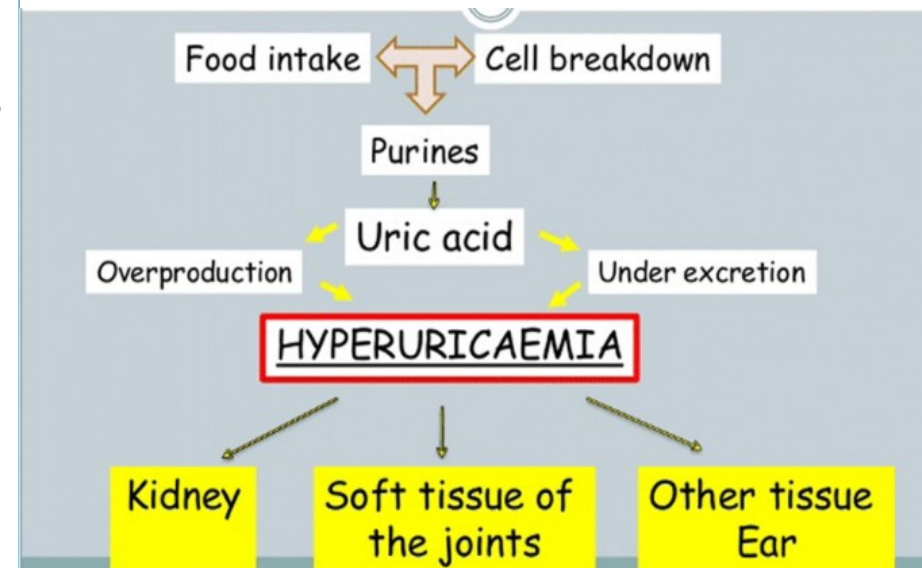
Gouty arthritis



Etiology:

Disturbance in **purine metabolism**
---> increase in serum uric acid --->
deposition of sodium urate crystals in
tissues

1. **Primary gout**: (known or unknown enzyme defect) hereditary predisposition
2. **Secondary gout**: Due to excess nucleoprotein destruction as in chronic myeloid leukaemia



https://www.researchgate.net/figure/Flow-chart-of-GOUT-pathophysiology_

Gouty arthritis



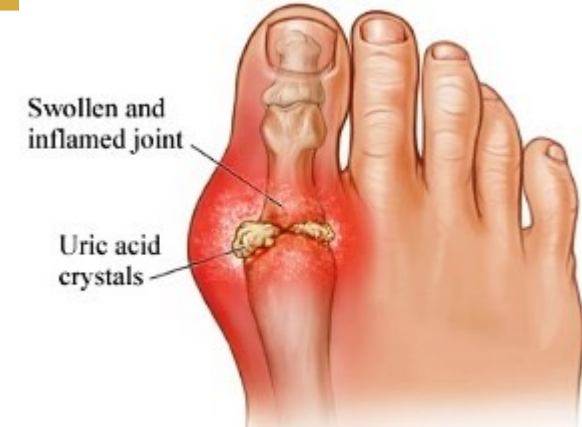
Pathology:

1. Increase serum uric acid
(hyperuricaemia)

2. Monosodium urate crystals
(MSU) deposition --->

a. Acute arthritis: particularly the **big toe** ---> severely inflamed with dense neutrophilic infiltration

b. Chronic tophaceous arthritis:
excess deposition of **MSU** crystals in cartilage and synovium ---> chronic inflammation and fibrosis ---> joint ankylosing



<https://www.optimaphysio.com/blog/evidence-based-physiotherapy-for-gout>





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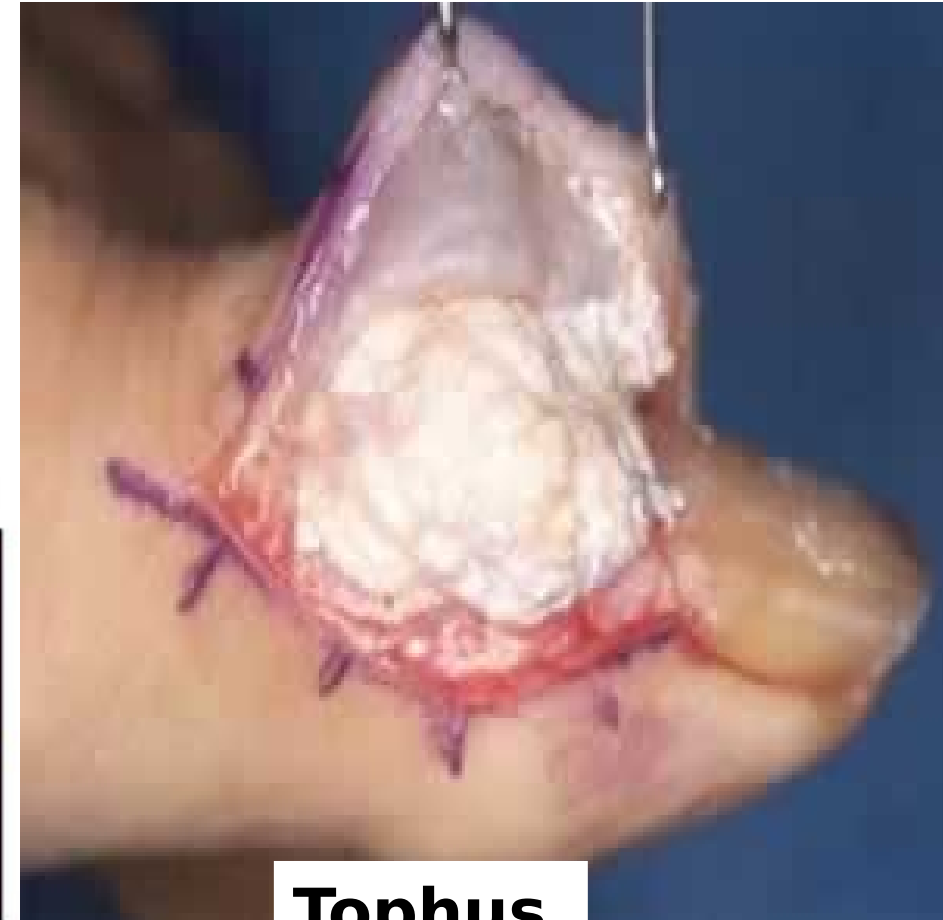
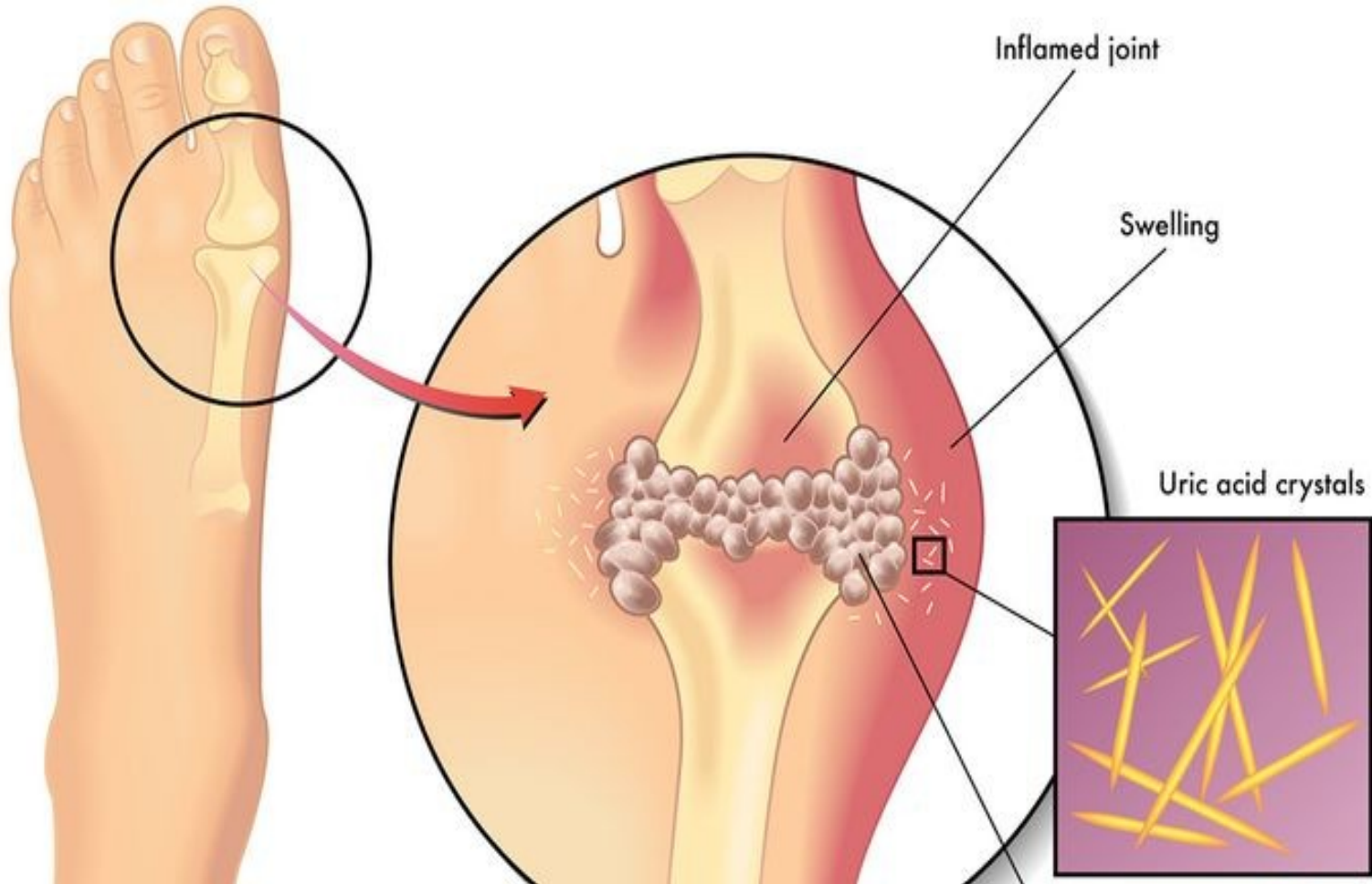


Figure 1: Gross specimen of a kidney showing a large, pale, lobulated mass, likely a renal tumor.

- ### 3. Subcutaneous (eyelids) ☐ ulceration of overlying skin

<https://www.google.com/search?q=Gouty%20cardiac%20valves%2C%20interstitium%20of%20the%20kidney>

Gouty arthritis



Tophus

Gouty arthritis



6/11/24



(Write the Name of the department)

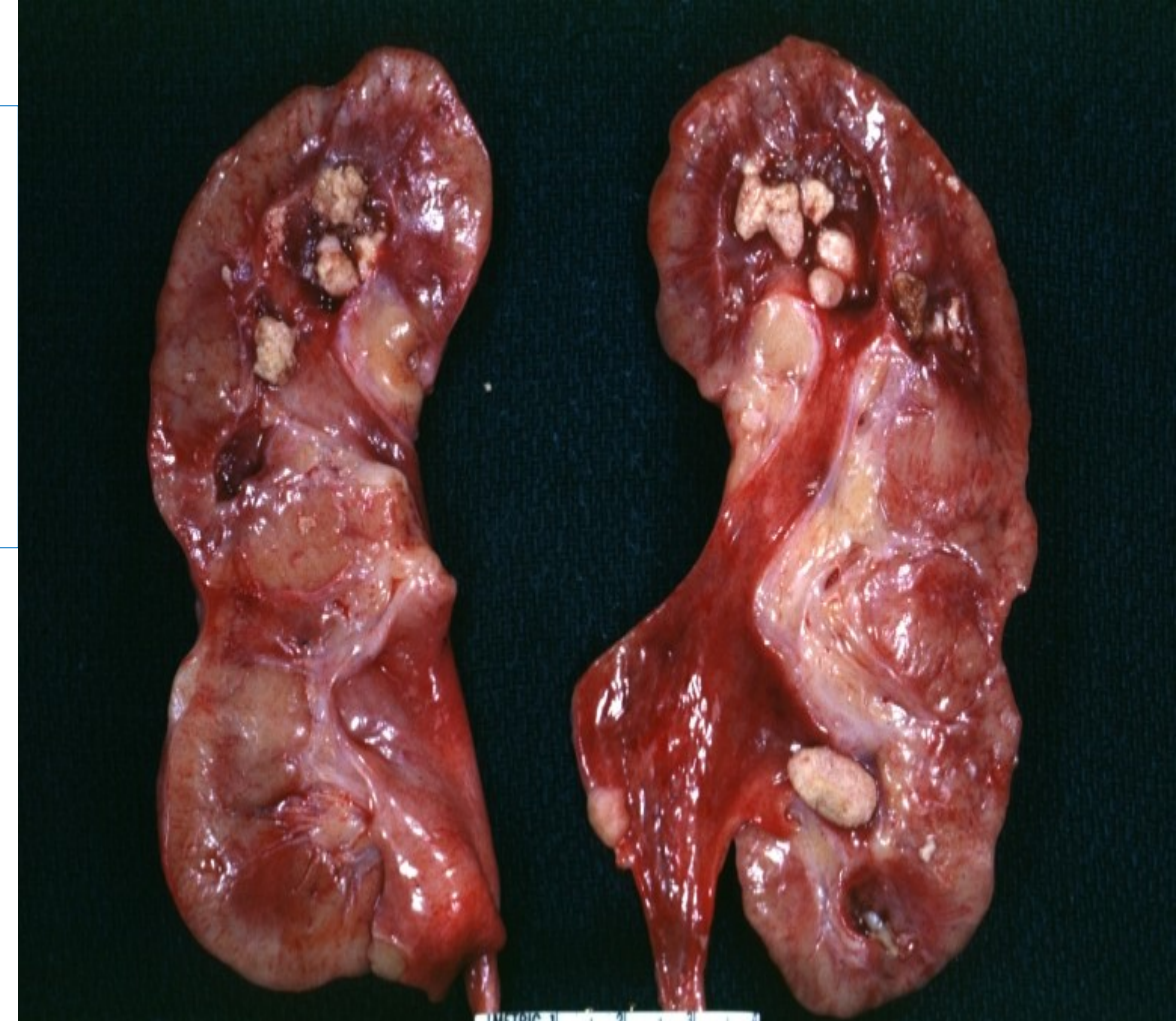
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Gouty arthritis



D. Gouty nephropathy:

- ❖ Tophi in the interstitial tissue of the kidney
- ❖ Uric acid/ urate stones in the renal pelvis and calyces
- ❖ Renal failure may occur



https://www.wikidoc.org/index.php/File:Gout_0033.jpg

Quiz



Rheumatoid arthritis is characterized by all of the following, Except:

- a. Affection of small joints
- b. Fibrinoid type necrosis of the synovium
- c. Creeping granulation tissue formation in the joint space
- d. Small nodules over the ear pinna and eyelids with ulcerated covering skin
- e. Subcutaneous nodules over the elbow joint

Quiz



A 60 years old, obese, female patient, complaining of bilateral knee pains that increases with walking, started few years ago in a progressive fashion. What do you expect to find in her knee joint:

- A. A creeping granulation tissue
- B. A chalky white nodular lesions
- C. Cartilagenous lippings that later ossify
- D. Synovial membrane necrosis
- E. Pus

SUGGESTED TEXTBOOKS



1. Robbins basic pathology, ninth Edition
2. Kaplan step 1 pathology lecture notes 2017 (P.78-98)